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AUTHOR Fitch, Michael J.
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ABSTRACT

This correlational study was part of an experimental project study on abused and non-abused children between the ages of two months and six years. Thirty-one children were administered the Bayley Scales of Infant Development (BSID) and the McCarthy Scales of Children's Abilities (MSCA). To determine the extent of MSCA and BSID relationship, Pearson product moment correlations were calculated. The MSCA Verbal Scale and General Cognitive Index correlated significantly with the BSID Mental Scale. There was, however, only one significant correlation between the BSID Motor Scale and the MSCA Scales. Based on these data, the MSCA seems to be an appropriate follow-up measure for use in longitudinal studies in which the BSID is utilized to measure infants' cognitive functioning. (BW)

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CORRELATIONS BETWEEN THE MCCARTHY SCALES OF CHILDREN'S ABILITIES AND THE BAYLEY SCALES OF INFANT DEVELOPMENT

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MICHAEL J. FITCH, Ed.D
DAVID P. STENGER, M.A.
Edward J. Goldson, M.D.
Elaine K. Jackson, M.A.
Darlene F. Swartz, F.S., R.N.
Theodore P. Wendell, M.S.W.

of the

Denver Department of Health and Hospitals
West 8th Avenue and Cherokee Streets
Denver, Colorado 80204

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INTRODUCTION

Few studies correlating the McCarthy Scales of Children's Abilities (MSCA) with other tests of cognitive functioning have been done due to the relative newness of the MSCA copyrighted in 1972. One correlational study was reported by McCarthy (1972). Thirty-five white first graders between six years zero months, and six years seven months were tested within a one month period utilizing the MSCA, and Wechsler Preschool and Primary Scale of Intelligence (WPPSI), and the Stanford Binet (form L-M). The MSCA General Cognitive Index (GCI) correlated .81 with the Stanford Binet IQ and .62 to .71 with the three WPPSI IQ's. The MSCA Verbal, Performance, Quantitative, and Memory Scales correlated .41 to .70 with the Stanford Binet IQ and .27 to .61 with the WPPSI IQ's. A study by Davis (1975) correlated the Stanford Binet (1972 norms) with the MSCA. Testing was done over a one month period utilizing 53 Caucasian children, ages five years three months to six years three months. These correlations, ranging from .24 for the Motor Scale to .92 for the Memory Scale, were generally higher than those reported in the MSCA Manual for the older Binet norms.

To date there have been no correlational studies reported between the MSCA and other measures of infant development such as the Bayley Scales of Infant Development (BSID). Futhermore, none of the existing correlational studies have covered a time interval of longer than one month. A study correlating the MSCA with the BSID would seem important for several reasons. First, more information on the MSCA needs

to be available as more clinicians and researchers are using this scale. Second, Bayley (1969) indicates that specific cognitive functions become differentiated with growth from simpler functions as measured by the BSID Mental and Motor Scales. Specifically, Bayley states that children's abilities, in the first two years, do not "array themselves into neat concurrently developing factors of mental and motor functions." Therefore, it seems important to determine the correlation that exists between the undifferentiated simpler functions as measured by the BSID and the more specific cognitive functions of the older child as measured by the MSCA. Finally, such a study could give some additional information on the usefulness of the BSID as a predictor of future cognitive functioning.

The MSCA yields scores for five separate intellectual functions: Verbal, Perceptual Performance, Quantitative, Memory, and Motor. Each of these scales has a mean of 50 with a standard deviation of 10. In addition, the MSCA yields a General Cognitive Index (GCI) with a mean of 100 and a standard deviation of 16. The BSID consists of a Mental Scale (MDI) and Motor Scale (PDI) with means of 100 and standard deviations of 16.

This correlational study was part of an experimental project studying abused and non-abused children. These children, between the ages of two months and six years, were enrolled in this project to study their cognitive development over a four year period. Because of this age span, it was necessary to utilize two scales to measure the children's cognitive functioning. The BSID was used for children between the ages of two and 30 months and the MSCA was used for children from 30 months to eight and a half years. Because of the longitudinal nature of the experimental project, it was necessary that both the BSID

and the MSCA be administered to a number of the children. Different time spans between administrations of the two tests provided the opportunity to estimate the effectiveness of the BSID as a predictor of cognitive functioning over periods of 6, 12 and 30 months.

METHOD

Subjects

A total of 31 children were administered both the BSID and the MSCA. All of these children were from a low income population who utilized the services of Denver General Hospital. Test scores were obtained from twenty abused children and from eleven children who had not been abused. The abused children's scores represent a potentially confounding variable, but the nature of the experimental project made their use unavoidable. The decision to include the scores of abused children in the data analysis was based on several factors. First, the sample size was substantially increased by the inclusion of their scores. Second, in an analysis done previously as part of the overall child abuse experiment using larger numbers of abused and non-abused children, no significant differences occurred between the changes in abused children's scores and the changes in non-abused children's scores when both groups were reevaluated using the same test as initially administered (see Table 1). The testings from which the change scores were derived were done at intervals of 6, 12 and 18 months following the first test. Therefore, we felt justified in assuming that the inclusion of abused children in the sample would not invalidate the findings.

Insert Table 1

Table 2 shows the ethnic background and sex of the children whose test scores were used in the correlation study.

Insert Table 2

Table 3 reports the mean age range of the children tested at the three time intervals.

Insert Table 3

Procedures

The children were in the project for varying lengths of time. Therefore, some of the 31 children were administered only one MSCA after a previous BSID and others received two or three MSCA testings following a BSID administration.

Both the BSID and the MSCA were administered by an experienced, certified child clinical psychologist or by pediatric psychology interns supervised at each administration by the child clinical psychologist. Testing was usually done at a developmental evaluation clinic, but in some cases, took place at the child's home.

To determine the extent of MSCA and BSID relationship, Pearson Product Moment Correlations were calculated.

RESULTS

Correlations between the BSID and MSCA scores were examined over a 30 month period. Tables 4, 5 and 6 present correlational data at six months, 12 months and 30 months. The MSCA was administered to seven children six months after they had been tested with the BSID. The BSID Mental Scale correlated at or beyond the .01 significance level with all MSCA scales except the MSCA Memory Scale. The correlation between these same two scales was still significant at the .05 level. Only two correlations were not significant at the .05 level: no significant correlations were found between the BSID Motor Scale and the MSCA Motor Scale or between the BSID Motor Scale and the MSCA Perceptual Performance Scale.

Insert Table 4

Twenty-four children were administered the MSCA 12 months after evaluation with the BSID. Table 5 indicates that with this longer period between testings, the BSID Mental Scale still correlates beyond the .05 significance level with the Verbal Scale and the GCI. However, the BSID Motor Scale does not significantly correlate with any of the MSCA scales at this 12 month interval.

Insert Table 5

Table 6 presents data from an expanded interval between testings. Fourteen children were administered the MSCA 30 months after their BSID testing. Despite the increased time span between testings, the GCI, Motor, Verbal, and Perceptual Performance Scales correlated at the .05 significance level with the BSID Mental Scale. The BSID Motor Scale correlated significantly with only the MSCA Motor Scale.

Insert Table 6

DISCUSSION

The MSCA Verbal Scale and General Cognitive Index correlated significantly with the BSID Mental Scale at the six, 12, and 30 month intervals. There was, however, only one significant correlation between the BSID Motor Scale and the MSCA Scales at either the 12 or 30 month intervals. It would appear, with this population, that the BSID Mental Scale is able to predict cognitive functioning as measured by the MSCA, at least over a 30 month period. These results would only partially support Bayley's

contention that specific cognitive abilities become differentiated with growth from simpler functions. Evidence from this study which fails to support Bayley's statement is the fact that the BSID Mental Scale did not correlate significantly with MSCA Quantitative or Memory Scales at the 12 or 30 month intervals.

It is interesting to note that correlations for the 30 month interval are generally higher than they were at the 12 month interval despite the fact that the children's mean age at the time of their BSID test was younger for the 30 month group (14.3 months) than it was for the 12 month group(24.8 months). These data are contrary to the commonly held notion that earlier BSID items with younger children are less predictive of future intellectual functioning than are later items with older children. One explanation for the lower correlation for the 12 month interval might involve the developmental changes occurring around the 24 month age level such as the expression of autonomy or negativism often seen at this age and the rapid onset of expressive language. Therefore, the lower correlation for the 12 month interval may be due to the children's age level at the time of their first testing.

Despite their only partial support of Bayley's hypotheses, the data suggest that the BSID Mental Scale and the MSCA Verbal Scale and GCI appear to measure abilities that are related in some fashion. Thus, the MSCA seems to be an appropriate follow-up measure for use in longitudinal studies in which the BSID is utilized to measure infants' cognitive functioning.

REFERENCES

Davis, E.E. Concurrent validity of the McCarthy Scales of Children's Abilities. Measurement and Evaluation in Guidance, 1975, 8, 101-104.

McCarthy, D. Manual for the McCarthy Scales of Children's Abilities. New York: The Psycological Corporation, 1972.

Bayley, N. Manual for the Bayley Scales of Infant Development. New York: The Psychological Corporation, 1969.

Table 1

T-Tests* for Differences Between Mean Change Scores of Abused vs. Non-Abused Children on the Bayley and McCarthy Scales at Various Testing Intervals

BAYLEY		Six Months	Twelve Months	Eighteen Months
Mental	t	-0.078	-0.310	0.188
	df	84	26	22
		$p > .90$	$p > .70$	$p > .80$
Motor	t	0.294	1.768	-0.199
	df	80	26	22
		$p > .70$	$.10 > p > .05$	$p > .80$

MCCARTHY		Verbal	Perceptual Performance	Quantitative	General Cognitive Index	Memory	Motor
Six Months	t	1.219	-0.061	-0.980	-0.353	0.445	-0.331
	df	16	16	16	16	16	13
		$p > .20$	$p > .90$	$p > .30$	$p > .70$	$p > .60$	$p > .70$
Twelve Months	t	0.242	1.592	0.789	-0.285	-1.070	0.349
	df	16	16	16	16	16	12
		$p > .80$	$p > .10$	$p > .40$	$p > .70$	$p > .30$	$p > .70$

(*) Used t-test for differences between means of samples with heterogeneous variances.

Table 2

Ethnicity and Sex of the Children

Tested at Each Time Interval

Interval	6 Months			12 Months				30 Months			
	Anglo	Chicano	Black	Anglo	Chicano	Black	Indian	Anglo	Chicano	Black	Indian
Male	2	1	0	8	5	1	1	5	4	0	1
Female	2	1	1	3	2	4	0	0	2	2	0
Total	4	2	1	11	7	5	1	5	6	2	1

Table 3

Mean Ages and Age Range, in Months, of the

Children at the Time of Each Test Administration

Time Interval	6 Months		12 Months		30 Months	
Mean Interval	6.5 Months		12.6 Months		30.9 Months	
	$\bar{X}$ Age	Range	$\bar{X}$ Age	Range	$\bar{X}$ Age	Range
Developmental Scales						
BSID	26.2	22.5-29.8	24.8	18.5-30.3	14.4	1.8-28.2
MSCA	32.7	28.8-35.2	37.4	32.0-43.6	45/3	32/0-56.4

Table 4

Scale Correlations Between the BSID and

the MSCA with a Time Interval of Six Months

McCarthy Scales	Verbal	Perceptual Performance	Quantitative	GCI	Memory	Motor
Bayley Scales						
Mental	.932***	.880***	.948***	.950***	.822**	.879***
Motor	.714**	.591	.931***	.741**	.677**	.646*

(*) $p < .10$
(**) $p < .05$
(***) $p < .01$

Table 5

Scale Correlations Between the BSID and

the MSCA with a Time Interval of Twelve Months

McCarthy Scales	Verbal	Perceptual Performance	Quantitative	GCI	Memory	Motor
Bayley Scales						
Mental	.470**	.386*	.145	.418**	.289	.320
Motor	.206	.172	.044	.184	.212	.123

(*) $p < .10$

(**) $p < .02$

Table 6

Scale Correlations Between the BSID and

the MSCA with a Time Interval of Thirty Months

McCarthy Scales	Verbal	Perceptual Performance	Quantitative	GCI	Memory	Motor
Bayley Scales						
Mental	.603**	.695***	.427	.591**	.505*	.716***
Motor	.422	.378	.447*	.416	.420	.571**

(*) < p .10
(**) < p .05
(***) < p .01